

Alternative Water Resources and Brominated Byproducts

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Abstract : As the global dependence on seawater desalination as a primary drinking water resource increases, a unique class of secondary pollutants is emerging. The presence of bromide salts in seawater may result in increased levels of bromine and brominated byproducts in drinking water. The State of Qatar offers a unique setting to study these pollutants and their impacts on consumers as the country is 100% dependent on seawater desalination to supply municipal tap water and locally produced bottled water. Tap water (n=115) and bottled water (n=62) samples were collected throughout the State of Qatar and analyzed for a suite of inorganic and organic compounds, including 54 volatile organic compounds (VOCs), with an emphasis on brominated byproducts. All VOC identification and quantification was completed using a Bruker Scion GCMSMS with static headspace technologies. A risk survey tool was used to collect information regarding local consumption habits, health outcomes and perception of water sources for adults and children. This study is the first of its kind in the country. Dibromomethane, bromoform, and bromobenzene were detected in 61%, 88% and 2%, of the drinking water samples analyzed. The levels of dibromomethane ranged from approximately 100-500 ng/L and the concentrations of bromoform ranged from approximately 5-50 µg/L. Additionally, bromobenzene concentrations were 60 ng/L. The presence of brominated compounds in drinking water is a public health concern specific to populations using seawater as a feed water source and may pose unique risks that have not been previously studied. Risk assessments are ongoing to quantify the risks associated with prolonged consumption of disinfection byproducts; specifically the risks of brominated trihalomethanes as the levels of bromoform found in Qatar's drinking water reach more than 60% of the US EPA's Maximum Contaminant Level of all THMs.

Keywords : brominated byproducts, desalination, trihalomethanes, risk assessment

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